

REMARKS

We are in receipt of the Office Action dated January 8, 2003, and the accompanying Amendment and following remarks are made in light thereof.

Claims 1-6, 8-31, 34-37, 42-45 and 48-80 are pending in the application, with claims 9-15, 36 and 37 having been withdrawn from consideration.

Pursuant to the Office Action, all pending claims are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-32 of co-pending Application No. 09/197,767 and over claims 1-26 of co-pending Application 09/550,598. Applicant respectfully requests that this rejection be held in abeyance until the claims are otherwise found allowable over the prior art, as the obvious-type double patenting rejection is merely provisional.

Claims 1, 6,8, 42-45, 54-59 and 60-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (U.S. 6,002,462). The present invention is directed to a device in which the upper surface of the pixel electrode is substantially flush with said light absorbing insulating material. Sato et al. do not teach the foregoing feature. In order to clarify the foregoing feature of the present invention, the above claims have been amended to recite this element.

Claims 2-5, 28-31, 34-35, 53, 71-80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. in view of Shimada et al. (U.S. 5,877,832). The present invention is directed to a device in which the first metal layer (first conductive film) is in contact with the second metal layer (second conductive film). In order to clarify the foregoing feature of the present invention, claims 2 and 3 have been amended as shown in the foregoing Amendment.

Sato et al. discloses that the color filters 13 cover the pixel electrodes (electrodes 12a and 12b) all over the inside and outside of the contact hole (see Fig. 2). If Sato et al. and Shimada et al. were combined, the picture element electrode 11 and the reflective layer 40 of Shimada et al. would not be in contact with each other due to the color filters 13 of Sato et al. being therebetween. Even if the picture element electrode 11 and the reflective layer 40 of Shimada et al. were made to be in contact with each other by removing a part or all of the color filters of Sato et al. over the pixel electrodes outside the contact hole, the remaining color filters should not work efficiently and the effect of the invention of Sato et al. will be lost. Therefore, it is inappropriate to combine Sato et al. and Shimada. Consequently, Applicant believes that the Examiner's 103(a) rejection of these claims is overcome by this Amendment.

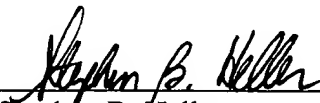
Claims 16-17 and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. in view of Misawa et al. (U.S. 5,250,931). The present invention is directed to a device in which the upper surface of the pixel electrode is substantially flush with said light absorbing insulating material. Sato et al. and Misawa et al. do not teach the foregoing feature. In order to clarify the foregoing feature of the present invention, Applicant has amended the above claims as shown in the attached Amendment.

Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. in view of Misawa et al. and Kunii et al. (U.S. 5,412,493). The present invention is directed to a device in which the upper surface of the pixel electrode is substantially flush with said light absorbing insulating material. Sato et al., Misawa et al. and Kunii et al. do not teach the foregoing feature. In order to clarify the foregoing feature of the present invention, Applicant has amended the above claims as shown in the attached Amendment.

Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. in view of Misawa et al. and Shimada et al. Applicant believes that the Examiner's rejection is overcome by the amendment of Claims 16 and 17 on which claims 20-21 depend, as shown in the attached Amendment, as well as claims 2-5, 28-31, 34-35, 53 and 71-80.

In view of the foregoing, Applicant respectfully submits that the pending claims are in condition for allowance, and an early Office Action in this regard is earnestly solicited.

Respectfully submitted,



Stephen B. Heller

Registration No.: 30,181

COOK, ALEX, McFARRON, MANZO
CUMMINGS & MEHLER, LTD.
200 West Adams Street, Suite 2850
Chicago, Illinois 60606
(312)236-8500

VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 1-3, 16-17, 42 and 48 have been amended to read as follows:

1. (Amended) A display device comprising a pixel matrix circuit constituted by a plurality of pixels each including at least one TFT and a pixel electrode connected to the TFT,

wherein ÷ a contact portion for electrical connection to the TFT is disposed at a part of the pixel electrode; ~~and~~,

wherein an insulating layer is embedded in a recess portion provided at the contact portion,

wherein the insulating layer comprises a light absorbing layer comprising a resin in which a pigment or a carbon-based material is contained, and

wherein an upper surface of said pixel electrode is substantially flush with said light absorbing insulating material.

2. (Amended) A display device comprising a pixel matrix circuit constituted by a plurality of pixels each including at least one TFT and a pixel electrode connected to the TFT,

wherein ÷ the pixel electrode includes a lamination structure of a first metal layer and a second metal layer; ~~and~~

wherein the first metal layer is in contact with the second metal layer,

an insulating layer is put between the first metal layer and the second metal layer at a contact portion where the first metal layer is connected with the TFT, and

wherein the insulating layer comprises a light absorbing layer comprising a resin in which a pigment or a carbon-based material is contained.

3. (Amended) A display device comprising a pixel matrix circuit ~~constituted by a plurality of pixels each including at least one a TFT and a pixel electrode connected to the TFT,~~

wherein:

~~the pixel electrode includes a lamination structure of a first metal layer and a second metal layer;~~

~~an insulating film is embedded in a recess portion disposed on the first metal layer;~~

~~the second metal layer is disposed so as to cover the first metal layer and the insulating film, comprising:~~

a TFT;

a first insulating layer over the TFT, wherein the first insulating layer comprises a contact hole;

a first conductive film over the first insulating film and in the contact hole, wherein the first conductive film is electrically connected to the TFT through the contact hole;

a second insulating layer filled in the contact hole, wherein an upper surface of the first conductive film outside the contact hole is not covered by the second insulating layer;

a second conductive film on and in contact with the upper surface of the first conductive film and the second insulating layer,

wherein the second insulating layer comprises a light absorbing layer comprising a resin in which a pigment or a carbon-based material is contained.

16. (Amended) An electronic device having at least one active matrix type liquid crystal panel, said liquid crystal panel comprising:

a substrate having an insulating surface;

an active matrix circuit formed over said substrate comprising a plurality of pixel electrodes, a plurality of switching elements for switching said pixel electrodes, respectively, an interlayer insulating film formed over said plurality of switching elements wherein each of said plurality of pixel electrodes is formed on said interlayer insulating film and electrically connected to the respective switching element through a contact hole of said interlayer insulating film; and

a driving circuit comprising a plurality of thin film transistors formed over said substrate for driving said active matrix circuit,

wherein a depression of said pixel electrode formed over said contact hole is filled with a light absorbing insulating material,

wherein the light absorbing insulating material comprises a resin in which a pigment or a carbon-based material is contained, and

wherein an upper surface of said pixel electrode is substantially flush with said light absorbing insulating material.

17. (Amended) An electronic device according to claim 16,

wherein each of said pixel electrodes comprises:

a first conductive layer which is formed on the interlayer insulating film and extends into said contact hole and electrically contacts the corresponding switching element; and

a second conductive layer which is formed on and in contact with the first conductive layer, ~~and a top surface of said insulating material is flush with a top surface of said first conductive layer.~~

42. (Amended) An electronic device having at least one active matrix type display device comprising:

at least one switching element;

at least one interlayer insulating film formed over said switching element;

a pixel electrode formed on said interlayer insulating film and electrically connected to said switching element through a contact hole of said interlayer insulating film;

a light absorbing insulating material formed in a depression of said pixel electrode over said contact hole,

wherein the light absorbing insulating material comprises a resin in which a pigment or a carbon-based material is contained, and

wherein an upper surface of said pixel electrode is substantially flush with said light absorbing insulating material.

48. (Amended) An electronic device having at least one active matrix type display device comprising:

at least one switching element;

at least one interlayer insulating film formed over said switching element;

a pixel electrode formed on said interlayer insulating film and electrically connected to said switching element through a contact hole of said interlayer insulating film;

a light absorbing insulating material formed in a depression of said pixel electrode over said contact hole,

wherein said insulating material is a light absorbing material comprising a resin in which a pigment or a carbon-based material is contained, and

• wherein an upper surface of said pixel electrode is substantially flush with said light
• absorbing insulating material.